SEQUENCE LISTING

<110> Ajinomoto Co., Inc.

<120> Method for Producing L-Amino Acid

<130>

<160> 24

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<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yahN gene

<400> 1
ggcgagctcc cagtaaccgg aaataag 27

<210> 2
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<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yahN gene

<400> 2
cgctctagaa aggaccacgc attacgg 27

<210> 3
<211> 27
<212> DNA

<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yeaS gene

<400> 3
ggcgagctca gattggttag catattc 27

<210> 4
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<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yeaS gene

<400> 4
cggtctagaa tcagcgaaga atcaggg 27

<210> 5
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<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yfiK gene

<400> 5
ggcgagctca tgttccgtgt cgggtac 27

<210> 6
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yfiK gene

<400> 6
ggctctagat agcaagttac taagcgg 27

<210> 7
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yggA gene

<400> 7
ctctgaattc tctcttatta gtttttctga ttgcc 35

<210> 8
<211> 38
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yggA gene

<400> 8
cgtgacctgc agcgttctca cagcgcggta gcctttaa 38

<210> 9
<211> 672
<212> DNA
<213> Escherichia coli

<220>
<221> CDS
<222> (1)..(672)

<400> 9
atg atg cag tta gtt cac tta ttt atg gat gaa atc act atg gat cct 48
Met Met Gln Leu Val His Leu Phe Met Asp Glu Ile Thr Met Asp Pro
1 5 10 15
ttg cat gcc gtt tac ctg acc gta gga ctg ttc gtg att act ttt ttt 96
Leu His Ala Val Tyr Leu Thr Val Gly Leu Phe Val Ile Thr Phe Phe

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                20                  25                  30
aat ccg gga gcc aat ctc ttt gtg gta gta caa acc agc ctg gct tcc   144
Asn Pro Gly Ala Asn Leu Phe Val Val Val Gln Thr Ser Leu Ala Ser
            35                  40                  45
ggt cga cgc gca ggg gtg ctg acc ggg ctg ggc gtg gcg ctg ggc gat   192
Gly Arg Arg Ala Gly Val Leu Thr Gly Leu Gly Val Ala Leu Gly Asp
        50                  55                  60
gca ttt tat tcc ggg ttg ggt ttg ttt ggt ctt gca acg cta att acg   240
Ala Phe Tyr Ser Gly Leu Gly Leu Phe Gly Leu Ala Thr Leu Ile Thr
65                  70                  75                  80
cag tgt gag gag att ttt tcg ctt atc aga atc gtc ggc ggc gct tat   288
Gln Cys Glu Glu Ile Phe Ser Leu Ile Arg Ile Val Gly Gly Ala Tyr
                85                  90                  95
ctc tta tgg ttt gcg tgg tgc agc atg cgc cgc cag tca aca ccg caa   336
Leu Leu Trp Phe Ala Trp Cys Ser Met Arg Arg Gln Ser Thr Pro Gln
            100                 105                 110
atg agc aca cta caa caa ccg att agc gcc ccc tgg tat gtc ttt ttt   384
Met Ser Thr Leu Gln Gln Pro Ile Ser Ala Pro Trp Tyr Val Phe Phe
        115                 120                 125
cgc cgc gga tta att acc gat ctc tct aac ccg caa acc gtt tta ttt   432
Arg Arg Gly Leu Ile Thr Asp Leu Ser Asn Pro Gln Thr Val Leu Phe
    130                 135                 140
ttt atc agt att ttc tca gta aca tta aat gcc gaa aca cca aca tgg   480
Phe Ile Ser Ile Phe Ser Val Thr Leu Asn Ala Glu Thr Pro Thr Trp
145                 150                 155                 160
gca cgt tta atg gcc tgg gcg ggg att gtg ctc gca tca att atc tgg   528
Ala Arg Leu Met Ala Trp Ala Gly Ile Val Leu Ala Ser Ile Ile Trp
                165                 170                 175
cga gtt ttt ctt agt cag gcg ttt tct ttg ccc gct gtg cgt cgt gct   576
Arg Val Phe Leu Ser Gln Ala Phe Ser Leu Pro Ala Val Arg Arg Ala
            180                 185                 190
tat ggg cgt atg caa cgc gtt gcc agt cgg gtt att ggt gca att att   624
Tyr Gly Arg Met Gln Arg Val Ala Ser Arg Val Ile Gly Ala Ile Ile
        195                 200                 205
ggt gta ttc gcg cta cgc ctg att tac gaa ggg gtg acg cag cgg tga   672
Gly Val Phe Ala Leu Arg Leu Ile Tyr Glu Gly Val Thr Gln Arg
    210                 215                 220
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<210> 10
<211> 223
<212> PRT
<213> Escherichia coli

<400> 10
Met Met Gln Leu Val His Leu Phe Met Asp Glu Ile Thr Met Asp Pro
1 5 10 15
Leu His Ala Val Tyr Leu Thr Val Gly Leu Phe Val Ile Thr Phe Phe
20 25 30
Asn Pro Gly Ala Asn Leu Phe Val Val Val Gln Thr Ser Leu Ala Ser
35 40 45
Gly Arg Arg Ala Gly Val Leu Thr Gly Leu Gly Val Ala Leu Gly Asp
50 55 60
Ala Phe Tyr Ser Gly Leu Gly Leu Phe Gly Leu Ala Thr Leu Ile Thr
65 70 75 80
Gln Cys Glu Glu Ile Phe Ser Leu Ile Arg Ile Val Gly Gly Ala Tyr
85 90 95
Leu Leu Trp Phe Ala Trp Cys Ser Met Arg Arg Gln Ser Thr Pro Gln
100 105 110
Met Ser Thr Leu Gln Gln Pro Ile Ser Ala Pro Trp Tyr Val Phe Phe
115 120 125
Arg Arg Gly Leu Ile Thr Asp Leu Ser Asn Pro Gln Thr Val Leu Phe
130 135 140
Phe Ile Ser Ile Phe Ser Val Thr Leu Asn Ala Glu Thr Pro Thr Trp
145 150 155 160
Ala Arg Leu Met Ala Trp Ala Gly Ile Val Leu Ala Ser Ile Ile Trp
165 170 175
Arg Val Phe Leu Ser Gln Ala Phe Ser Leu Pro Ala Val Arg Arg Ala
180 185 190
Tyr Gly Arg Met Gln Arg Val Ala Ser Arg Val Ile Gly Ala Ile Ile
195 200 205
Gly Val Phe Ala Leu Arg Leu Ile Tyr Glu Gly Val Thr Gln Arg
210 215 220

<210> 11
<211> 639
<212> DNA
<213> Escherichia coli

<220>
<221> CDS
<222> (1)..(639)

<400> 11
gtg ttc gct gaa tac ggg gtt ctg aat tac tgg acc tat ctg gtt ggg 48

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Met Phe Ala Glu Tyr Gly Val Leu Asn Tyr Trp Thr Tyr Leu Val Gly
  1               5                  10                  15
gcc att ttt att gtg ttg gtg cca ggg cca aat acc ctg ttt gta ctc   96
Ala Ile Phe Ile Val Leu Val Pro Gly Pro Asn Thr Leu Phe Val Leu
            20                  25                  30
aaa aat agc gtc agt agc ggt atg aaa ggc ggt tat ctt gcg gcc tgc   144
Lys Asn Ser Val Ser Ser Gly Met Lys Gly Gly Tyr Leu Ala Ala Cys
         35                  40                  45
ggt gta ttt att ggc gat gcg gta ttg atg ttt ctg gca tgg gct gga   192
Gly Val Phe Ile Gly Asp Ala Val Leu Met Phe Leu Ala Trp Ala Gly
     50                  55                  60
gtg gcg aca tta att aag acc acc ccg ata tta ttc aac att gta cgt   240
Val Ala Thr Leu Ile Lys Thr Thr Pro Ile Leu Phe Asn Ile Val Arg
 65                  70                  75                  80
tat ctt ggt gcg ttt tat ttg ctc tat ctg ggg agt aaa att ctt tac   288
Tyr Leu Gly Ala Phe Tyr Leu Leu Tyr Leu Gly Ser Lys Ile Leu Tyr
                 85                  90                  95
gcg acc ctg aag ggt aaa aat agc gag gcc aaa tcc gat gag ccc caa   336
Ala Thr Leu Lys Gly Lys Asn Ser Glu Ala Lys Ser Asp Glu Pro Gln
            100                 105                 110
tac ggt gct att ttt aaa cgc gcg tta att ttg agc ctg act aat ccg   384
Tyr Gly Ala Ile Phe Lys Arg Ala Leu Ile Leu Ser Leu Thr Asn Pro
        115                 120                 125
aaa gcc att ttg ttc tat gtg tcg ttt ttc gta cag ttt atc gat gtt   432
Lys Ala Ile Leu Phe Tyr Val Ser Phe Phe Val Gln Phe Ile Asp Val
    130                 135                 140
aat gcc cca cat acg gga att tca ttc ttt att ctg gcg gcg acg ctg   480
Asn Ala Pro His Thr Gly Ile Ser Phe Phe Ile Leu Ala Ala Thr Leu
145                 150                 155                 160
gaa ctg gtg agt ttc tgc tat ttg agc ttc ctg att ata tct ggt gct   528
Glu Leu Val Ser Phe Cys Tyr Leu Ser Phe Leu Ile Ile Ser Gly Ala
                165                 170                 175
ttt gtc acg cag tac ata cgt acc aaa aag aaa ctg gct aaa gtt ggc   576
Phe Val Thr Gln Tyr Ile Arg Thr Lys Lys Lys Leu Ala Lys Val Gly
            180                 185                 190
aac tca ctg att ggt ttg atg ttc gtg ggt ttc gct gcc cga ctg gcg   624
Asn Ser Leu Ile Gly Leu Met Phe Val Gly Phe Ala Ala Arg Leu Ala
        195                 200                 205
acg ctg caa tcc tga                                              639
Thr Leu Gln Ser
    210
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<210> 12
<211> 212
<212> PRT
<213> Escherichia coli

<400> 12
Met Phe Ala Glu Tyr Gly Val Leu Asn Tyr Trp Thr Tyr Leu Val Gly
1 5 10 15
Ala Ile Phe Ile Val Leu Val Pro Gly Pro Asn Thr Leu Phe Val Leu
20 25 30
Lys Asn Ser Val Ser Ser Gly Met Lys Gly Gly Tyr Leu Ala Ala Cys
35 40 45
Gly Val Phe Ile Gly Asp Ala Val Leu Met Phe Leu Ala Trp Ala Gly
50 55 60
Val Ala Thr Leu Ile Lys Thr Thr Pro Ile Leu Phe Asn Ile Val Arg
65 70 75 80
Tyr Leu Gly Ala Phe Tyr Leu Leu Tyr Leu Gly Ser Lys Ile Leu Tyr
85 90 95
Ala Thr Leu Lys Gly Lys Asn Ser Glu Ala Lys Ser Asp Glu Pro Gln
100 105 110
Tyr Gly Ala Ile Phe Lys Arg Ala Leu Ile Leu Ser Leu Thr Asn Pro
115 120 125
Lys Ala Ile Leu Phe Tyr Val Ser Phe Phe Val Gln Phe Ile Asp Val
130 135 140
Asn Ala Pro His Thr Gly Ile Ser Phe Phe Ile Leu Ala Ala Thr Leu
145 150 155 160
Glu Leu Val Ser Phe Cys Tyr Leu Ser Phe Leu Ile Ile Ser Gly Ala
165 170 175
Phe Val Thr Gln Tyr Ile Arg Thr Lys Lys Lys Leu Ala Lys Val Gly
180 185 190
Asn Ser Leu Ile Gly Leu Met Phe Val Gly Phe Ala Ala Arg Leu Ala
195 200 205
Thr Leu Gln Ser
210

<210> 13
<211> 588
<212> DNA
<213> Escherichia coli

<220>
<221> CDS

<222> (1)..(588)

<400> 13

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gtg aca ccg acc ctt tta agt gct ttt tgg act tac acc ctg att acc   48
Met Thr Pro Thr Leu Leu Ser Ala Phe Trp Thr Tyr Thr Leu Ile Thr
  1               5                  10                  15
gct atg acg cca gga ccg aac aat att ctc gcc ctt agc tct gct acg   96
Ala Met Thr Pro Gly Pro Asn Asn Ile Leu Ala Leu Ser Ser Ala Thr
             20                  25                  30
tcg cat gga ttt cgt caa agt acc cgc gtg ctg gca ggg atg agt ctg   144
Ser His Gly Phe Arg Gln Ser Thr Arg Val Leu Ala Gly Met Ser Leu
         35                  40                  45
gga ttt ttg att gtg atg tta ctg tgt gcg ggc att tca ttt tca ctg   192
Gly Phe Leu Ile Val Met Leu Leu Cys Ala Gly Ile Ser Phe Ser Leu
     50                  55                  60
gca gtg att gac ccg gca gcg gta cac ctt ttg agt tgg gcg ggg gcg   240
Ala Val Ile Asp Pro Ala Ala Val His Leu Leu Ser Trp Ala Gly Ala
 65                  70                  75                  80
gca tat att gtc tgg ctg gcg tgg aaa atc gcc acc agc cca aca aag   288
Ala Tyr Ile Val Trp Leu Ala Trp Lys Ile Ala Thr Ser Pro Thr Lys
                 85                  90                  95
gaa gac gga ctt cag gca aaa cca atc agc ttt tgg gcc agc ttt gct   336
Glu Asp Gly Leu Gln Ala Lys Pro Ile Ser Phe Trp Ala Ser Phe Ala
            100                 105                 110
ttg cag ttt gtg aac gtc aaa atc att ttg tac ggt gtt acg gca ctg   384
Leu Gln Phe Val Asn Val Lys Ile Ile Leu Tyr Gly Val Thr Ala Leu
        115                 120                 125
tcg acg ttt gtt ctg ccg caa aca cag gcg tta agc tgg gta gtt ggc   432
Ser Thr Phe Val Leu Pro Gln Thr Gln Ala Leu Ser Trp Val Val Gly
    130                 135                 140
gtc agc gtt ttg ctg gcg atg att ggg acg ttt ggc aat gtg tgc tgg   480
Val Ser Val Leu Leu Ala Met Ile Gly Thr Phe Gly Asn Val Cys Trp
145                 150                 155                 160
gcg ctg gcg ggg cat ctg ttt cag cga ttg ttt cgc cag tat ggt cgc   528
Ala Leu Ala Gly His Leu Phe Gln Arg Leu Phe Arg Gln Tyr Gly Arg
                165                 170                 175
cag tta aat atc gtg ctt gcc ctg ttg ctg gtc tat tgc gcg gta cgc   576
Gln Leu Asn Ile Val Leu Ala Leu Leu Leu Val Tyr Cys Ala Val Arg
            180                 185                 190
att ttc tat taa                                                  588
Ile Phe Tyr
        195
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<210> 14
<211> 195
<212> PRT
<213> Escherichia coli

<400> 14

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  1               5                  10                  15
Ala Met Thr Pro Gly Pro Asn Asn Ile Leu Ala Leu Ser Ser Ala Thr
             20                  25                  30
Ser His Gly Phe Arg Gln Ser Thr Arg Val Leu Ala Gly Met Ser Leu
         35                  40                  45
Gly Phe Leu Ile Val Met Leu Leu Cys Ala Gly Ile Ser Phe Ser Leu
     50                  55                  60
Ala Val Ile Asp Pro Ala Ala Val His Leu Leu Ser Trp Ala Gly Ala
 65                  70                  75                  80
Ala Tyr Ile Val Trp Leu Ala Trp Lys Ile Ala Thr Ser Pro Thr Lys
                 85                  90                  95
Glu Asp Gly Leu Gln Ala Lys Pro Ile Ser Phe Trp Ala Ser Phe Ala
            100                 105                 110
Leu Gln Phe Val Asn Val Lys Ile Ile Leu Tyr Gly Val Thr Ala Leu
        115                 120                 125
Ser Thr Phe Val Leu Pro Gln Thr Gln Ala Leu Ser Trp Val Val Gly
    130                 135                 140
Val Ser Val Leu Leu Ala Met Ile Gly Thr Phe Gly Asn Val Cys Trp
145                 150                 155                 160
Ala Leu Ala Gly His Leu Phe Gln Arg Leu Phe Arg Gln Tyr Gly Arg
                165                 170                 175
Gln Leu Asn Ile Val Leu Ala Leu Leu Leu Val Tyr Cys Ala Val Arg
            180                 185                 190
Ile Phe Tyr
        195
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<210> 15
<211> 636
<212> DNA
<213> Escherichia coli

<220>
<221> CDS
<222> (1)..(636)

<400> 15

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gtg ttt tct tat tac ttt caa ggt ctt gca ctt ggg gcg gct atg atc   48
Met Phe Ser Tyr Tyr Phe Gln Gly Leu Ala Leu Gly Ala Ala Met Ile
  1               5                  10                  15
cta ccg ctc ggt cca caa aat gct ttt gtg atg aat cag ggc ata cgt   96
Leu Pro Leu Gly Pro Gln Asn Ala Phe Val Met Asn Gln Gly Ile Arg
             20                  25                  30
cgt cag tac cac att atg att gcc tta ctt tgt gct atc agc gat ttg   144
Arg Gln Tyr His Ile Met Ile Ala Leu Leu Cys Ala Ile Ser Asp Leu
         35                  40                  45
gtc ctg att tgc gcc ggg att ttt ggt ggc agc gcg tta ttg atg cag   192
Val Leu Ile Cys Ala Gly Ile Phe Gly Gly Ser Ala Leu Leu Met Gln
     50                  55                  60
tcg ccg tgg ttg ctg gcg ctg gtc acc tgg ggc ggc gta gcc ttc ttg   240
Ser Pro Trp Leu Leu Ala Leu Val Thr Trp Gly Gly Val Ala Phe Leu
 65                  70                  75                  80
ctg tgg tat ggt ttt ggc gct ttt aaa aca gca atg agc agt aat att   288
Leu Trp Tyr Gly Phe Gly Ala Phe Lys Thr Ala Met Ser Ser Asn Ile
                 85                  90                  95
gag tta gcc agc gcc gaa gtc atg aag caa ggc aga tgg aaa att atc   336
Glu Leu Ala Ser Ala Glu Val Met Lys Gln Gly Arg Trp Lys Ile Ile
            100                 105                 110
gcc acc atg ttg gca gtg acc tgg ctg aat ccg cat gtt tac ctg gat   384
Ala Thr Met Leu Ala Val Thr Trp Leu Asn Pro His Val Tyr Leu Asp
        115                 120                 125
act ttt gtt gta ctg ggc agc ctt ggc ggg caa ctt gat gtg gaa cca   432
Thr Phe Val Val Leu Gly Ser Leu Gly Gly Gln Leu Asp Val Glu Pro
    130                 135                 140
aaa cgc tgg ttt gca ctc ggg aca att agc gcc tct ttc ctg tgg ttc   480
Lys Arg Trp Phe Ala Leu Gly Thr Ile Ser Ala Ser Phe Leu Trp Phe
145                 150                 155                 160
ttt ggt ctg gct ctt ctc gca gcc tgg ctg gca ccg cgt ctg cgc acg   528
Phe Gly Leu Ala Leu Leu Ala Ala Trp Leu Ala Pro Arg Leu Arg Thr
                165                 170                 175
gca aaa gca cag cgc att atc aat ctg gtt gtg gga tgt gtt atg tgg   576
Ala Lys Ala Gln Arg Ile Ile Asn Leu Val Val Gly Cys Val Met Trp
            180                 185                 190
ttt att gcc ttg cag ctg gcg aga gac ggt att gct cat gca caa gcc   624
Phe Ile Ala Leu Gln Leu Ala Arg Asp Gly Ile Ala His Ala Gln Ala
        195                 200                 205
ttg ttc agt tag                                                  636
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Leu Phe Ser
210

<210> 16
<211> 211
<212> PRT
<213> Escherichia coli

<400> 16
Met Phe Ser Tyr Tyr Phe Gln Gly Leu Ala Leu Gly Ala Ala Met Ile
1 5 10 15
Leu Pro Leu Gly Pro Gln Asn Ala Phe Val Met Asn Gln Gly Ile Arg
20 25 30
Arg Gln Tyr His Ile Met Ile Ala Leu Leu Cys Ala Ile Ser Asp Leu
35 40 45
Val Leu Ile Cys Ala Gly Ile Phe Gly Gly Ser Ala Leu Leu Met Gln
50 55 60
Ser Pro Trp Leu Leu Ala Leu Val Thr Trp Gly Gly Val Ala Phe Leu
65 70 75 80
Leu Trp Tyr Gly Phe Gly Ala Phe Lys Thr Ala Met Ser Ser Asn Ile
85 90 95
Glu Leu Ala Ser Ala Glu Val Met Lys Gln Gly Arg Trp Lys Ile Ile
100 105 110
Ala Thr Met Leu Ala Val Thr Trp Leu Asn Pro His Val Tyr Leu Asp
115 120 125
Thr Phe Val Val Leu Gly Ser Leu Gly Gly Gln Leu Asp Val Glu Pro
130 135 140
Lys Arg Trp Phe Ala Leu Gly Thr Ile Ser Ala Ser Phe Leu Trp Phe
145 150 155 160
Phe Gly Leu Ala Leu Leu Ala Ala Trp Leu Ala Pro Arg Leu Arg Thr
165 170 175
Ala Lys Ala Gln Arg Ile Ile Asn Leu Val Val Gly Cys Val Met Trp
180 185 190
Phe Ile Ala Leu Gln Leu Ala Arg Asp Gly Ile Ala His Ala Gln Ala
195 200 205
Leu Phe Ser
210

<210> 17
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<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yahN gene

<400> 17
gtgtggaacc gacgccggat 20

<210> 18
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yahN gene

<400> 18
tgttgtatgg tacggggttc gag 23

<210> 19
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<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yeaS gene

<400> 19
ctttgccaat cccgtctccc 20

<210> 20
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yeaS gene

<400> 20

gccccatgca taacggaaag 20

<210> 21
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yfiK gene

<400> 21
gaagatcttg taggccggat aaggcg 26

<210> 22
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yfiK gene

<400> 22
tggttttacc aattggccgc 20

<210> 23
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yggA gene

<400> 23
acttctcccg cgagccagtt c 21

<210> 24
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yggA gene

<400> 24
ggcaagctta gcgcctctgt t 21